Electrosurgery

References

AORN Standards & Recommended Practices, (2002)Denver: AORN Publication.,Sec. III, Pg. 221-228.

Bray, Cynthia. Electrosurgery: Principles and Practices. Video, Davis & Geck-1812

Fortunato, N., Berry & Kohn's Introduction to Operating Room Technique. 9th ed., St. Louis: Mosby-Year Book, Inc., Chap 20, p. 313-318, 2000.

Fuller J,. Surgical Technology Principles and Practice. 3rd ed., Philadelphia: W.B.Saunders Company, Chap. 13, pg. 138-140, 1994.

Meeker, M. and Rothrock, J., Alexander's Care of the Patient in Surgery. 11th ed., St. Louis: Mosby-Year Book, Inc., Chap. 3, Pg. 90-93, 1999.

Terminal Learning Objective

Given a simulated Operating Room (OR) and the necessary supplies and equipment,

Apply safety measures when using and inspecting an Electrosurgical Unit (ESU) and equipment before, during, and after surgery.

IAW Cited references.

Enabling Learning Objectives

A. Given a list of electrosurgery terms, match each term to its definition IAW AORN and Berry and Kohn's Care of the Patient in Surgery.

B. Given a list of Safety factors, select the safety factors involved in using the ESU IAW Fuller and Berry and Kohn's.

C. Given steps for preparation of the ESU, prepare the ESU prior to use IAW Berry and Kohn's.

Enabling Learning Objectives

D. Given the appropriate information, identify the roles of the OR team during and after use of the ESU IAW AORN, Berry and Kohn's, & Fuller.

E. Given routine cleaning procedures, select those applicable before and after the use of the ESU IAW Berry and Kohn's, and Fuller.

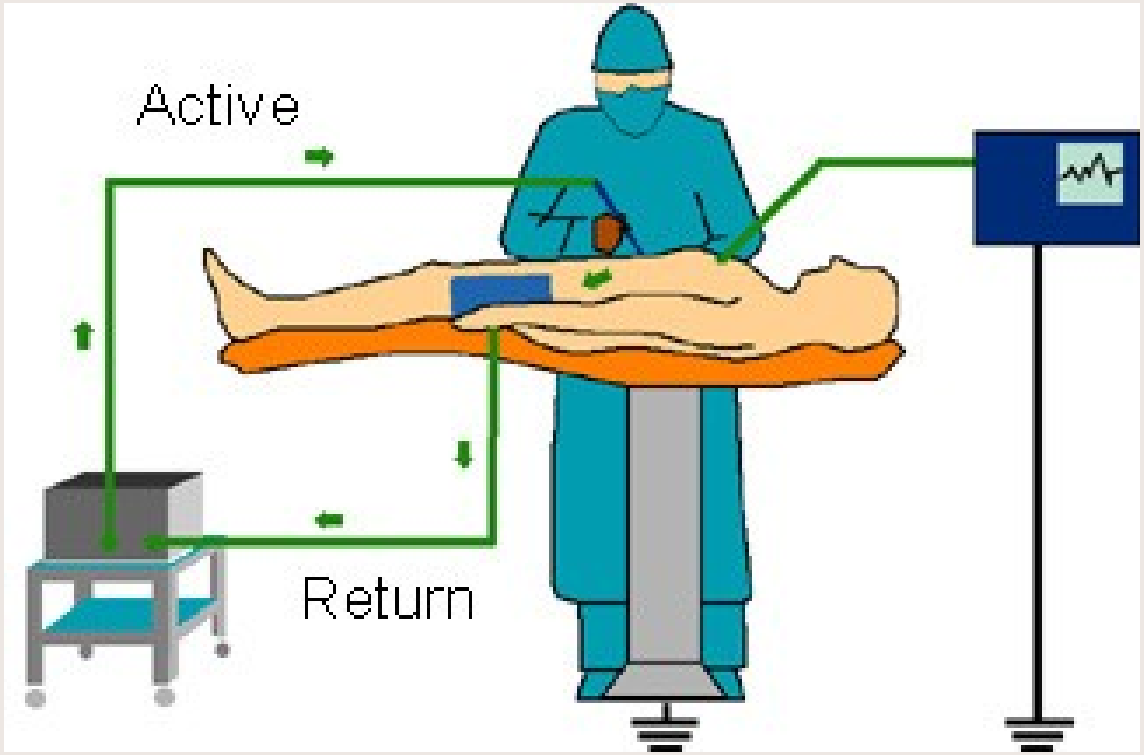
F. Given dispersive and active ESU electrodes, demonstrate the steps for inspection, placement, and connection to the ESU IAW cited references.

Electrosurgery Terms and Definitions

- **Electrosurgery**
- Definition: the use of radio frequency electrical current to cut, coagulate or destroy tissue.
  - Alternating current.
  - Current enters the patient's body.
  - The circuit: generator, active electrode, patient, and patient return electrode.

http://66.45.30.237//static/pofe/pofes4.htm

Electrosurgery - Process



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Electrosurgery Terms and Definitions

- **Electrosurgical Unit**

ELO A
Electrosurgery Terms and Definitions

- Electrosurgical Unit: - generator, foot pedal, cords. Active electrode and dispersive electrode designed to safely deliver electric current through tissue.
- Current: Flow of Electrons
- Active Electrode (Bovie)
- Dispersive Electrode (Grounding pad)

Terms and Definitions

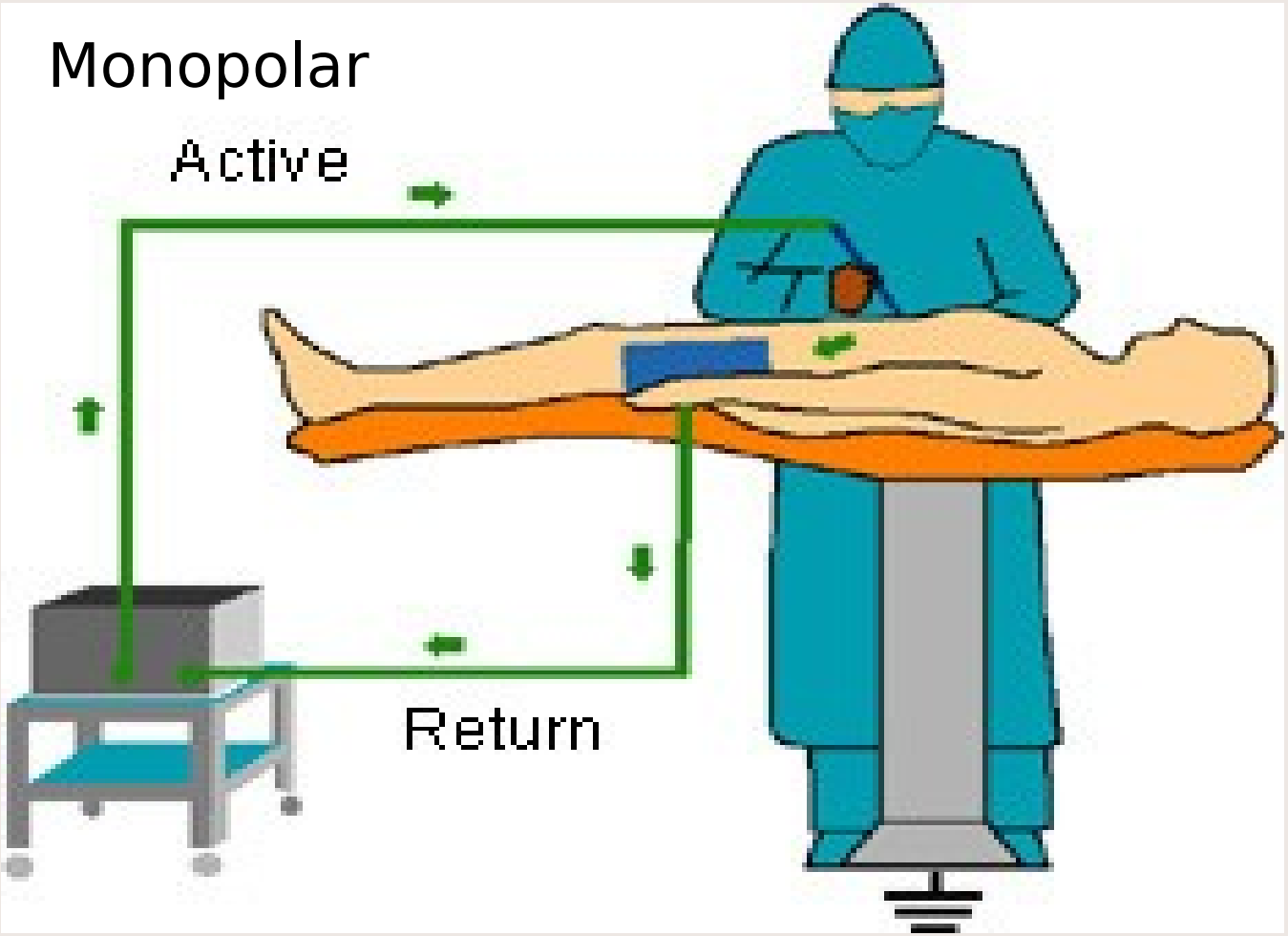
- **Coagulation (“Coag”)***
  - **Definition:clotting of blood by burning the ends of vessels to control bleeding.**
  - Fulguration and desiccation
- **Cutting**
  - Definition: electric current divides tissue without coagulation.
  - current is a continuous waveform.
  - lower voltages required to achieve tissue vaporization.

Terms and Definitions

- **Blend***
  - combination effects of cutting and coagulating
  - dampened waveform that produces some hemostasis during cutting.

- **Mono-polar (unipolar)**
  - Current flows through the patient to the patient return electrode.
  - Active electrode is in the wound.
  - Patient return electrode attached on the patient.

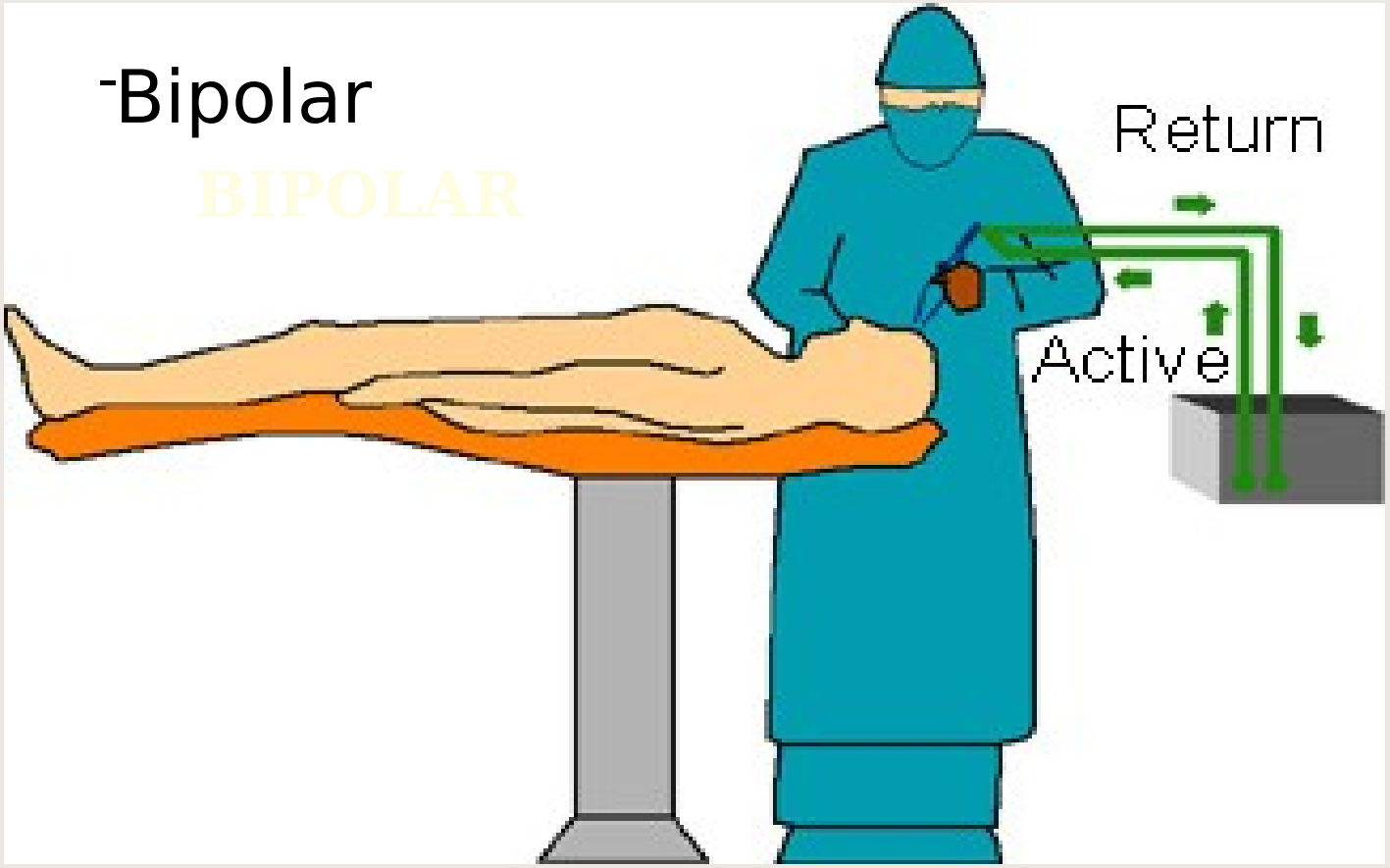
Terms and Definitions



Terms and Definitions

- Bipolar
  - Active electrode and return electrode functions at site of surgery. (Forceps tines).
  - Only the tissue grasped included in electrical circuit. (current passes only between tips of forceps).
  - No patient return (dispersive) electrode needed.

Terms and Definitions



Terms and Definitions

10 of 10

- QUESTION - True or false

Monopolar electrosurgery requires the use of a grounding pad.

ANSWER: True

ELO B
Safety Factors

- **Metallic Jewelry**
  - **Rings**
  - **Body Piercing's**
  - **Earrings**
- **Flammable Prep Solutions***
  - **Alcohol**
  - **Betadine**
  - **Duraprep**
- **Separate circuits for ESU and other equipment.**

Safety Factors

2 of 5

- **Position cords to prevent accidents.**
- **Investigate repeated request for more current.***

Safety Factors

3 of 5

- **Do no harm.**

Safety Factors

4 of 5

- **Question: Why do you think the ESU should not be plugged into the same circuit as other equipment?**

  Answer: Possible interference to video equipment, etc; possible power drain to shared equipment leading to decreased effectiveness; possible over load on circuit resulting in loss of power.

Safety Factors

5 of 5

- Question: The surgeon repeatedly complains that the tissue is not being cut/cauterized and tells you to increase the ESU power settings, what should you do?

Answer: 1. check the placement of the grounding pad, 2. check that the patient is not in contact with any metal on the OR table or positioning devices, 3. check the connections between the pen and the ESU, 4. suggest trying a new active electrode (Bovie pencil).

ELO C
Preparation of ESU

- **Be familiar with manufacturer's manual.**
- **Check biomedical sticker for recent inspection.**
- **Have accessories available;**
  - **Adaptors**
  - **Cables/cords**
  - **Foot pedal**
  - **Pads/Plates**
- **Check for exposed wires.**

Preparation of ESU

2 of 4

- **Test sound and lights before each use.**
- **Set volume.**
- **Protect foot pedal***
- **Avoid spills or placing fluids on ESU.**
- **Confirm power setting with the <u>surgeon</u> before ESU is activated.***

Preparation of ESU

3 of 4

- **Question: When the surgeon tests the active electrode for audible response, no sound is heard.**

  What should you do?

Answer: Check that the volume is turned on and loud enough for the surgeon to hear.

Preparation of ESU

4 of 4

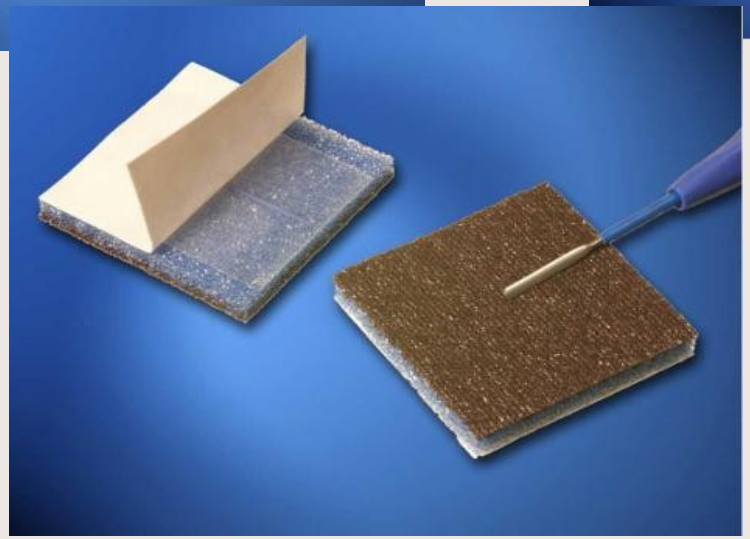
- **Question: That's not it, now what?**

Answer: Recheck proper placement of the grounding pad and all connections.

ELO D
SCRUB DUTIES

- **Inspect Bovie for defects.**
  - **Handpieces and cords**
  - **Special attention to endoscopic instruments**
- **Secure Bovie in holster/Canister***
- **Clean Bovie tip between uses.**
  - **Scratch Pad**
  - **Sponge**
  - **Back of knife blade**
- **Plume.**

SCRUB DUTIES



http://www.lina-medical.com/linapages/elect_003.html

CIRCULATOR DUTIES

- **Ensure unit is in off position before connecting cables.**
- **Check the bovie and grounding pad cable connections should be clean and dry and inspected both at the patient and the machine.**
- **Cover and place foot pedal near the surgeons foot.**

Dispersive electrodes

CIRCULATOR DUTIES

2 of 8

- ***Placement of dispersive electrode (Bovie pad)***
  - **Check with anesthesia provider.**
  - **Avoid patient to metal contact.**
  - **Check equipment for damage.**
  - **Conductive material must cover pad completely.**
  - **Use appropriate size pad.**
  - **Place pad prior to drapes.**

CIRCULATOR DUTIES

- ***Placement of dispersive electrode(cont)***
  - **Place pad close to operative site. Avoid the following:**
    - **Bony prominences.***
    - **Hairy surfaces.**
    - **Scar tissue.***
    - **Pre-existing skin lesions.**
    - **Metallic implants and pacemakers.**

CIRCULATOR DUTIES

5of 8

- ***Placement of dispersive Electrode (cont)***
  - **Pad must maintain uniform body contact.**
    - **Avoid gaps or bubbles**
  - **Do not place tension on cord.**

CIRCULATOR DUTIES

6 of 8

- **Check both Bovie and dispersive pad connections.**
- **Be alert to malfunctions.**
- **Duties following surgery.**
  - **Turn off ESU and dial to 0.**
  - **Disconnect all cords.**
  - **Remove pad, inspect site.**

CIRCULATOR DUTIES

7 of 8

- **Question: The active electrode cord is accidentally cut on the sterile field. What should be done and who should do it?**

  Think about this in terms of the sterile field.

Remove the defective ***without*** contaminating your field and Replace it with a new active electrode

CIRCULATOR DUTIES

8 of 8

- **Question: You are the circulator, you see that the patient's skin is red and blistered when the grounding pad is removed, what should you do?**

Notify the surgical team, particularly the surgeon, document the injury, and report episode to the PACU staff.

ELO E
ROUTINE CARE OF ESU

- **Clean IAW manufacture's recommendations and Infection Control policies**
- **Discard plastic bag on foot pedal.**
- **Clean ESU and foot pedal.**
- **Clean and inspect all reusable items.**

ELO E
ROUTINE CARE OF ESU

- Question: You are turning the OR over between arthroscopies, water is everywhere. Should you remove the protective bag from the ESU foot pedal?

- Why do you think your answer is correct?

Answer: Yes, the equipment must be completely cleaned between patients.

Infection control and safety issues.

Summary

This lecture provided you with the necessary information to:

- A. Match each given electrosurgery term to its given definition
- B. Select the safety factors involved in using the ESU
- C. Prepare the ESU prior to use

Summary

This lecture provided you with the necessary information to:

- D. Distinguish the roles of the OR team during and after use of the ESU

- E. Select applicable routine cleaning procedures before and after the use of the ESU

Questions???

Quiz

MATCH :

Active electrode **d.**	**a. Accessory used to direct electric current from the patient back to the generator.**
Inactive electrode **a.**	**b. Clotting of blood by burning the ends of vessels to control bleeding.**
Coagulation **b.**	**c. Electric current that is intense enough to divide tissue with coagulation.**
Cutting **c.**	**d. Accessory used to direct electric current to the surgical site.**

Multiple Choice

Confirm power settings for the ESU with the:

a. Scrub Surgeon
b. Circulator
c. Surgeon Anesthetist
d.

6. Bovie pad should be placed as close to the operative site as possible Scar tissue avoiding the following:

Multiple Choice

7. Select the duty performed by the scrub during the use of the ESU.

a. Turns dial to “0”
b. Ensures cable connection is clean and dry prior to plugging into ESU
c. Adjusts settings per the surgeon’s request
d. Inspects Bovie active dispersing unit and cord for signs of defect

Inspects Bovie active dispersing unit and cord for signs of defect

Multiple Choice

8. Prior to placement of grounding pad on the patient, you should check with the:

a. Scrub
b. Circulator
c. Anesthetist
d. Patient

Anesthetist

Multiple Choice

9. Select the duty performed by the circulator **during the use** of the ESU:

a. Clean Bovie tip between uses with a scratch pad or sponge.

b. Remove grounding pad, inspect site for possible burns.

c. Check both Bovie and grounding pad cables.

Check both Bovie and grounding pad cables.

d. Disconnect all cords.

Multiple Choice

10. If flammable skin prep solutions are used, ensure skin surface:

a. Has been wiped with a clean towel prior to draping.

b. Is blown dry with a fan prior to draping.

c. Is completely dry prior to draping.

d. Is covered with a Chux before draping